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Date of Birth : 17-May-2018  
Sex : M  
Collected : 22/Mar/2022  
Received: 23-Mar-2022  
46 SUNSHINE STREET  
MANLY VALE NSW 2093  
Lab id : **3804736** UR#: 6125577

YOUNG HEALTHY LIVING CENTRE  
34 CLARKE STREET  
YOUNG NSW 2594

## COMPLETE MICROBIOME MAPPING

### General Macroscopic Description

	Result	Range	Markers
Stool Colour	<b>Brown</b>		<b>Colour</b> - Brown is the colour of normal stool. Other colours may indicate abnormal GIT conditions.
Stool Form	<b>Formed</b>		<b>Form</b> - A formed stool is considered normal. Variations to this may indicate abnormal GIT conditions.
Mucous	<b>NEG</b>	< +	<b>Mucous</b> - Mucous production may indicate the presence of an infection, inflammation or malignancy.
Occult Blood	<b>NEG</b>	< +	<b>Blood (Macro)</b> - The presence of blood in the stool may indicate possible GIT ulcer, and must always be investigated immediately.

### GIT Functional Markers

	Result	Range	Units	
Calprotectin.	<b>14.0</b>	0.0 - 50.0	ug/g	
Pancreatic Elastase	<b>&gt;500.0</b>	> 200.0	ug/g	
Faecal Secretory IgA	<b>627.0</b>	510.0 - 2010.0	ug/g	
Faecal Zonulin	<b>89.9</b>	0.0 - 107.0	ng/g	
Faecal B-Glucuronidase	<b>2479.2</b>	337.0 - 4433.0	U/g	
Steatocrit	<b>2.0</b>	0.0 - 15.0	%	
anti-Gliadin IgA	<b>&lt;20</b>	0.0 - 100.0	units/L	

### Microbiome Mapping Summary

#### Parasites & Worms

Dientamoeba fragilis.

#### Bacteria & Viruses

#### Fungi and Yeasts

### Key Phyla Microbiota

<b>Bacteroidetes</b>	<b>8.70</b>	8.61 - 33.10	x10 <sup>11</sup> org/g	
<b>Firmicutes</b>	<b>11.20</b>	5.70 - 30.40	x10 <sup>10</sup> org/g	
<b>Firmicutes:Bacteroidetes Ratio</b>	<b>0.13</b>	< 1.00	RATIO	





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Parasites and Worms.	Result	Range	Units	
<b>Parasitic Organisms</b>				
Cryptosporidium.	<dl	< 1.0	x10 <sup>6</sup> org/g	
Entamoeba histolytica.	<dl	< 1.0	x10 <sup>4</sup> org/g	
Giardia lamblia.	<dl	< 5.0	x10 <sup>3</sup> org/g	
Blastocystis hominis.	<dl	< 2.0	x10 <sup>3</sup> org/g	
Dientamoeba fragilis.	<b>716.6 *H</b>	< 1.0	x10 <sup>5</sup> org/g	
Endolimax nana	<dl	< 1.0	x10 <sup>4</sup> org/g	
Entamoeba coli.	<dl	< 5.0	x10 <sup>6</sup> org/g	
Pentatrichomonas hominis	<dl	< 1.0	x10 <sup>2</sup> org/g	
<b>Worms</b>				
Ancylostoma duodenale, Roundworm	Not Detected			Comment: Not Detected results indicate the absence of detectable DNA in this sample for the worms reported.
Ascaris lumbricoides, Roundworm	Not Detected			
Necator americanus, Hookworm	Not Detected			
Trichuris trichiura, Whipworm	Not Detected			
Taenia species, Tapeworm	Not Detected			
Enterobius vermicularis, Pinworm	Not Detected			
Opportunistic Bacteria/Overgr	Result	Range	Units	
Bacillus species.	0.6	< 1.5	x10 <sup>5</sup> org/g	
Enterococcus faecalis	<dl	< 1.0	x10 <sup>4</sup> org/g	
Enterococcus faecium	0.7	< 1.0	x10 <sup>4</sup> org/g	
Morganella species	<dl	< 1.0	x10 <sup>3</sup> org/g	
Pseudomonas species	<dl	< 1.0	x10 <sup>4</sup> org/g	
Pseudomonas aeruginosa.	<dl	< 5.0	x10 <sup>2</sup> org/g	
Staphylococcus species	<dl	< 1.0	x10 <sup>4</sup> org/g	
Staphylococcus aureus	<dl	< 5.0	x10 <sup>2</sup> org/g	
Streptococcus species	0.5	< 1.0	x10 <sup>3</sup> org/g	
Methanobacteriaceae	0.80	< 5.00	x10 <sup>9</sup> org/g	
Desulfovibrio piger	<dl	0.0 - 18.0	x10 <sup>7</sup> org/g	
Oxalobacter formigenes	143.8	> 15.0	x10 <sup>7</sup> org/g	
<b>Potential Autoimmune Triggers</b>				
Citrobacter species.	<dl	< 5.0	x10 <sup>5</sup> org/g	
Citrobacter freundii.	<dl	< 5.0	x10 <sup>5</sup> org/g	
Klebsiella species	<dl	< 5.0	x10 <sup>3</sup> org/g	
Klebsiella pneumoniae.	<dl	< 5.0	x10 <sup>4</sup> org/g	
Prevotella copri	<dl	< 1.0	x10 <sup>7</sup> org/g	
Proteus species	<dl	< 5.0	x10 <sup>4</sup> org/g	
Proteus mirabilis.	<dl	< 1.0	x10 <sup>3</sup> org/g	
Fusobacterium species	0.60	< 10.00	x10 <sup>7</sup> org/g	
Fungi & Yeast	Result	Range	Units	
Candida species.	<dl	< 5.0	x10 <sup>3</sup> org/g	
Candida albicans.	<dl	< 5.0	x10 <sup>2</sup> org/g	
Geotrichum species.	<dl	< 3.0	x10 <sup>2</sup> org/g	
Microsporidium species	<dl	< 5.0	x10 <sup>3</sup> org/g	
Rhodotorula species.	<dl	< 1.0	x10 <sup>3</sup> org/g	



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Bacterial Pathogens	Result	Range	Units	
Aeromonas species.	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Campylobacter.	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
C. difficile, Toxin A	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
C. difficile, Toxin B	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Enterohemorrhagic E. coli	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
E. coli O157	<dl	< 1.0	x10 <sup>2</sup> CFU/g	●
Enteroinvasive E. coli/Shigella	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Enterotoxigenic E. coli LT/ST	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Shiga-like Toxin E. coli stx1	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Shiga-like Toxin E. coli stx2	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Salmonella.	<dl	< 1.0	x10 <sup>4</sup> CFU/g	●
Vibrio cholerae	<dl	< 1.0	x10 <sup>5</sup> CFU/g	●
Yersinia enterocolitica.	<dl	< 1.0	x10 <sup>5</sup> CFU/g	●
Helicobacter pylori	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●

**Comment: Helico Pylori virulence factors will be listed below if detected POSITIVE**

H.pylori Virulence Factor, babA	Not Detected	H.pylori Virulence Factor, cagA	Not Detected
H.pylori Virulence Factor, dupA	Not Detected	H.pylori Virulence Factor, iceA	Not Detected
H.pylori Virulence Factor, oipA	Not Detected	H.pylori Virulence Factor, vacA	Not Detected
H.pylori Virulence Factor, virB	Not Detected	H.pylori Virulence Factor, virD	Not Detected

Viral Pathogens	Result	Range	Units	
Adenovirus 40/41	<dl	< 1.0	x10 <sup>10</sup> CFU/g	●
Norovirus GI/II	<dl	< 1.0	x10 <sup>7</sup> CFU/g	●
Bocavirus	<dl	< 1.0	x10 <sup>10</sup> CFU/g	●

Normal Bacterial GUT Flora	Result	Range	Units	
Bacteroides fragilis	4.5	1.6 - 250.0	x10 <sup>9</sup> CFU/g	●
Bifidobacterium species	704.8	> 6.7	x10 <sup>7</sup> CFU/g	●
Bifidobacterium longum	122.3	> 5.2	x10 <sup>6</sup> CFU/g	●
Enterococcus species	4.4	1.9 - 2000.0	x10 <sup>5</sup> CFU/g	●
Escherichia species	515.1	3.7 - 3800.0	x10 <sup>6</sup> CFU/g	●
Lactobacillus species	6.0 *L	8.6 - 6200.0	x10 <sup>5</sup> CFU/g	●
Lactobacillus Rhamnosus	2.1 *L	8.3 - 885.0	x10 <sup>4</sup> CFU/g	●
Clostridium species	6.2	5.0 - 50.0	x10 <sup>6</sup> CFU/g	●
Enterobacter species	1.1	1.0 - 50.0	x10 <sup>6</sup> CFU/g	●
Akkermansia muciniphila	17.73	0.01 - 50.00	x10 <sup>3</sup> CFU/g	●
Faecalibacterium prausnitzii	346.2	1.0 - 500000	x10 <sup>3</sup> CFU/g	●

Short Chain Fatty Acids	Result	Range	Units	
Short Chain Fatty Acids, Beneficial	23.4	> 13.6	umol/g	●
Butyrate	13.0	10.8 - 33.5	%	●
Acetate	66.1	44.5 - 72.4	%	●
Propionate	18.0	0.0 - 32.0	%	●
Valerate	2.9	0.5 - 7.0	%	●



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## Pathogen Summary:

### Macroscopy Comment

BROWN coloured stool is considered normal in appearance.

### Metabolism Comment

In a healthy gut Short Chain Fatty Acids are exhibited in the following proportions;  
Butyrate, Acetate, Propionate ( 16% : 60% : 24% )

#### VALERATE:

Valerate is a short chain fatty acid that is important for gut health. Although Acetate, propionate, and butyrate make up the the most abundant SCFAs in gastrointestinal tract (95%), Valerate and other SCFA's make up the remaining and work optimally when within range.

### GIT Markers Comment

PANCREATIC ELASTASE: Normal exocrine pancreatic function.

Pancreatic Elastase reflects trypsin, chymotrypsin, amylase and lipase activity.

This test is not affected by supplements of pancreatic enzymes.

Healthy individuals produce on average 500 ug/g of PE-1. Thus, levels below 500 ug/g and above 200 ug/g suggest a deviation from optimal pancreatic function.

The clinician should therefore consider digestive enzyme supplementation if one or more of the following conditions is present:

Loose watery stools, Undigested food in the stools, Post-prandial abdominal pain, Nausea or colicky abdominal pain, Gastroesophageal reflux symptoms, Bloating or food intolerance.

#### CALPROTECTIN Normal:

Faecal calprotectin values <50 ug/g are not indicative of inflammation in the gastrointestinal tract. Subjects with low faecal calprotectin levels normally do not need to be further investigated by invasive procedures.

#### FAECAL SECRETORY IgA:

Production of sIgA is important to the normal function of the gastrointestinal mucosa as an immune barrier.

It represents the first line immune defense of the GIT.

Elevated levels are associated with an upregulated immune response.

### Parasites/Worms Comment

#### ELEVATED DIENTAMOEBIA FRAGILIS LEVEL:

Significant copies per gene of Dientamoeba fragilis have been detected in this stool sample. Dientamoeba fragilis is closely related to Histomonas and Trichomonas species. D. fragilis is known to cause non-invasive diarrheal illness in humans. 90% of children are symptomatic, whereas only 15-20% of adults are. The most common symptoms associated with D. fragilis are intermittent diarrhoea, fatigue, abdominal pain, fatigue, nausea, anorexia, malaise and unexplained eosinophilia. Diarrhea is predominately seen during the first 1-2 weeks of infection and abdominal pain may persist for 1-2 months.

#### Treatment:

Iodoquinol, tetracycline or metronidazole have been used to treat D. fragilis. Another alternative is paromomycin.

Using a combination of herbs that contain berberine (e.g. Golden seal, Coptis chinensis, Barberry, Oregon grape and Phellodendron) is desirable for the treatment of certain organisms. It is important to investigate the percentage of berberine contained in the dry weight extract of the berberine containing herb and then dose accordingly for the therapeutic dose of berberine.

Total therapeutic dose of berberine: 200mg four times daily.

#### Further Investigation:

PCR stool analysis should be considered in 4 weeks' time to ensure infection has cleared.



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## Opportunistic Bacteria Comment

### METHANOBACTERIACEAE:

Family of bacteria-like microbes that produce methane. Facilitates carbohydrate fermentation and short-chain fatty acid production by beneficial bacteria.

LOW levels may indicate reduced production of short-chain fatty acids and may be associated with inflammation.

HIGH levels linked to chronic constipation, as well as some types of SIBO and IBS.

### DESULFOVIBRIO COMMENT:

Sulfate is present in different concentrations in the intestine dependent on diet. Remnants not absorbed, alongside the presence of lactate, promote the growth of Sulfate reducing bacteria (SRB). Desulfovibrio Piger is the dominant SRB genus and has been implicated in gastrointestinal disorders such as ulcerative colitis via the reduction of sulfate to hydrogen sulphide in the gut. High Desulfovibrio piger levels serves as an indicator of inflammatory bowel disease.

Treatment options include lowering the intake of sulfate rich foods such as some breads, dried fruits, beers, ciders and wines.

Reference: Kushkevych et. Al., J. Clin. Med. 2019, 8, 1054; doi:10.3390/jcm8071054

### OXALOBACTER COMMENT:

Oxalate is formed in the liver by amino acid catabolism as well as present in a wide range of foods including tea, coffee, chocolate and certain fruits and vegetables. High concentration of oxalate in the urine is related to the potential formation of calcium oxalate kidney stones. Oxalobacter Formigenes is the main known bacterial species involved in oxalate degradation in the gut.

Levels of O. Formigenes tends to decrease with age as well as with the use of antibiotics or other drugs, with low levels identified as a risk factor for calcium oxide stone formation. Treatment options include probiotic treatment and low oxalate diet modification.

Urinary oxalate levels can also be monitored by test code 4025 (oxalate urinary).

Reference: Duncan et. al., Applied and Environmental Microbiology, Aug. 2002, p. 3841-3847

Kaufman et. al., J Am Soc Nephrol. 2008 Jun; 19(6): 1197-1203.

## Potential Autoimmune Comments

### FUSOBACTERIUM SPECIES:

Fusobacterium species is a gram-negative bacteria in the Fusobacteria phylum. The bacteria is a common member of the human oral microbiome, this pro-inflammatory bacterium can also be found in the human gut. In the mouth, high levels are strongly linked to oral hygiene. In the gut, high levels have been observed in individuals with colon cancer and appendicitis.

Sources:

It primarily uses protein as its main source. However, research also shows that it can thrive from sugar.

Treatment:

Antimicrobial botanicals such as berberine, oregano, quercetin, curcumin, green and black tea extracts, blueberry extract, cinnamon and rosemary have shown to decrease levels.

## Normal Bacterial Flora Comment

### LOW LACTOBACILLUS SPECIES LEVEL:

Lactate-producing bacteria in the Firmicutes phylum.

Low levels may be due to low carbohydrate intake or high salt intake, and may also indicate reduced mucosal health.

### LOW LACTOBACILLUS RHAMNOSUS LEVEL:

Lactobacillus Rhamnosus is a bacteria in the Firmicutes phylum. Lactobacillus rhamnosus is one of the most widely used probiotic strains. Various health effects are well documented including the prevention and treatment of gastro-intestinal infections and diarrhea, and stimulation of immune responses. Low levels may be linked to poor digestive health, diarrhea and IBS symptoms.



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# The Four “R” Treatment Protocol

REMOVE	Using a course of antimicrobial, antibacterial, antiviral or anti parasitic therapies in cases where organisms are present. It may also be necessary to remove offending foods, gluten, or medication that may be acting as antagonists.  Consider testing IgG96 foods as a tool for removing offending foods.	ANTIMICROBIAL	Oil of oregano, berberine, caprylic acid
		ANTIBACTERIAL	Liquorice, zinc camosine, mastic gum, tribulus, berberine, black walnut, caprylic acid, oil of oregano
		ANTIFUNGAL	Oil of oregano, caprylic acid, berberine, black walnut
		ANTIPARASTIC	Artemesia, black walnut, berberine, oil of oregano
		ANTIVIRAL	Cat's claw, berberine, echinacea, vitamin C, vitamin D3, zinc, reishi mushrooms
		BIOFILM	Oil of oregano, protease
REPLACE	In cases of maldigestion or malabsorption, it may be necessary to restore proper digestion by supplementing with digestive enzymes.	DIGESTIVE SUPPORT	Betaine hydrochloride, tilactase, amylase, lipase, protease, apple cider vinegar, herbal bitters
REINOCULATE	Recolonisation with healthy, beneficial bacteria. Supplementation with probiotics, along with the use of prebiotics helps re-establish the proper microbial balance.	PREBIOTICS	Slippery elm, pectin, larch arabinogalactans
		PROBIOTICS	Bifidobacterium animalis subsp lactise, lactobacillus acidophilus, lactobacillus plantarum, lactobacillus casei, bifidobacterium breve, bifidobacterium bifidum, bifidobacterium longum, lactobacillus salivarius subsp salivarius, lactobacillus paracasei, lactobacillus rhamnosus, Saccharomyces boulardii
REPAIR & REBALANCE	Restore the integrity of the gut mucosa by giving support to healthy mucosal cells, as well as immune support. Address whole body health and lifestyle factors so as to prevent future GI dysfunction.	INTESTINAL MUCOSA IMMUNE SUPPORT	Saccharomyces boulardii, lauric acid
		INTESTINAL BARRIER REPAIR	L-Glutamine, aloe vera, liquorice, marshmallow root, okra, quercetin, slippery elm, zinc camosine, Saccharomyces boulardii, omega 3 essential fatty acids, B vitamins
		SUPPORT CONSIDERATION	Sleep, diet, exercise, and stress management